lower jaw of *Symborodon* does not possess any. He pointed out that these animals had small brains, with few convolutions, which were separated by deep fissures occupied by thin bony laminæ, and that the falx and tentorium are well developed. He pointed out the relatively small size of the brain, and that at least half of the length of the cranium is occupied by enormous, undivided frontal sinuses. Each of these communicates with the nasal meatus by an elongate foramen, and enters the base of the corresponding horn core. He stated that similar sinuses exist in the cranium of *Eobasileus*, and enter the basis of the middle pair of horns in the same manner.

JUNE 23.

The President, Dr. RUSCHENBERGER, in the chair.

Twenty-one members present.

On the Pelvis of Hadrosaurus.—Prof. B. WATERHOUSE HAWKINS, having completed his model of Hadrosaurus at Princeton College, took the occasion to call the attention of the Academy to his success in placing certain fugitive bones belonging to Hadrosaurus, and also to its English cousin Iguanodon. It might be allowable to remind the meeting of the fact that in 1868, when he had made and presented the restoration of Hadrosaurus now in the museum, he then recognized the homologous character of a bone described by Dr. Leidy in his monograph of the Cretaceous Reptiles, to that which had become a fugitive bone in Iguanodon, the English representative of Hadrosaurus. These bones had been for many years appointed to the place of clavicles by Prof. Owen and Dr. Mantel, of England. When Mr. Hawkins made his large restoration of Iguanodon at the Crystal Palace, in 1853, his first difficulty was to find room for these so-called clavicles in his model, a task which he was obliged to abandon, as they were twice the size which the natural arrangement of the limbs rendered possible. A few days previous to his sailing for America he found that Prof. Huxley had been studying the same problem of their true position in the animal's body, concerning which he delivered an address before the Royal Institution. Prof. Huxley, on this occasion, transposed the pseudo-clavicles from the pectoral to the pelvic arch, where he arranged them either as pubic or ischiatic bones, and placed them as in the ostrich and rhea. At the same time this transposition was taken advantage of to suggest the probability of Iguanodon walking on its hind legs, thus accounting for some of the larger forms of bipedal footprints, and justifying the establishment of the new order Ornithosauria. On the arrival of Prof. Hawkins in America, after studying Dr. Leidy's description of Hadrosaurus, he found that Dr. L. had anticipated

Prof. Huxley's transposition of the pseudo-clavicles, which he suggested in the above-named description might more probably represent the ischiatic bones of Hadrosaurus. While engaged in the Central Park, in developing the external form of this former inhabitant of New Jersey, Mr. Hawkins found it necessary to renew the whole question as to the component parts of the pelvic arch of these giants, which he practically tested with casts from the actual fossils, endeavoring to ascertain their true position according to both Dr. Leidy's and Prof. Huxley's views. In this attempt he utterly failed, finding it impossible to place these fugitive bones in such relationship to the gigantic femur as would enable either animal to make footprints similar to those found both in England and America. This being the case at the moment when the iconoclastic Central Park Commission declined allowing the further prosecution of paleozoic studies in the Park, the inquiry was not continued until the opportunity was afforded by the trustees of the New Jersey College at Princeton, who desired to possess for their new museum one of Mr. Hawkins's restorations of an extinct animal of New Jersey. For this purpose they selected Hadrosaurus, which enabled Mr. H. to again investigate the true position of the bones in question, which he has finally placed as the analogues of the abdominal plastron-like supports, found largely developed in the pelvic region of the alligator. This position of the bones, when united with the bipedal carriage of the body, suggested immediately an analogy between these fugitive bones and marsupial bones of the Didelphidæ. These remarks were illustrated by Mr. Hawkins in his usual manner by crayon drawings on the slate.

Prof. COPE stated that he was still of the opinion that the evidence derived from *Lælops* and *Megadactylus* rendered it necessary to believe in the backward direction of these bones in *Hadrosaurus*.

Prof. COPE described a species of Dipnoan fish of the genus *Ctenodus* from the coal measures of Ohio, based on specimens placed in his hands by Prof. Newberry, as follows:—

The top of the head is covered with angular plates or scuta, arranged in the following manner on the region presented. Two symmetrical scuta occupy the median line, one in front of the other. One of these is a longish coffin-shaped hexagonal, with the suture with the other concave. The latter is more ovoid, broad and convex next the first mentioned, and somewhat more contracted at the opposite extremity. Beyond this are two shields joining by a straight suture on the middle line; besides this one, they have two concave sutures for scuta, at the farther end two concave lateral sutures, and a straight one to the adjoining median scutum, whose suture is also concave. On each side of this median plate is a large area surrounded before outwards, and

behind, by smaller scuta, three in front, two at the side, and two behind. Commencing with the first, No. 1 has already been described. No. 2 is small, oval, and antero-posterior; No. 3 is an antero-posterior pentagon, with the narrowest side inwards. No. 4 is a similar transverse pentagon. No. 5 is an antero-posterior pentagon, which presents its shorter lateral facet inwards. No. 6 has a similar character, but is smaller and with more definite angles. Another series of scuta is seen outside of these at one end of the series. Three of this set bound the front and side of each of the median pair above mentioned, leaving a short facet next its fellow unaccounted for. The sculpture consists of radiating ridges and tubercles, which are most broken near the centres of the scuta. The tubercles and ridges are obtuse and low, and the latter do not inosculate. An angular depression commenced at the middle of each lateral area, and extends across the middle line at the point of junction of the paired and single median scuta.

	M.
Width of vertex at middle scuta	0.176
Length of single median scute	.048

JUNE 30.

The President, Dr. RUSCHENBERGER, in the chair.

Fifteen members present.

Permission having been granted (the meeting being for business), Prof. PERSIFOR FRAZER, Jr., made the following remarks:—

In the investigation of the chemical formulas of minerals, the student will meet with two kinds of difficulties. The first is the great variations in the analysis, and the next is the connecting together in the formula for the particular mineral of different compounds by the sign +. The first of these difficulties is a necessary consequence of the manner of formation and occurrence of minerals in the midst of solutions of other materials, and consequently subjected to mechanical and chemical conditions tending to add impurities to it, (whether by percolations through its open joints, crevices, and pores, or by oxidizing or partially decomposing it).

The first results of the best processes of mechanical separation merely reduce to a low per cent. the admixture of one mineral with another of greatly different sp. gr., and even the best known chemical methods can never succeed in producing an absolutely and theoretically pure substance. So much less probable is it that the deposits of compounds by the mechanical and chemical processes which a change of the conditions of the surrounding nature have caused, and which have not been bottled up in impervious glass jars, but left to the action of the rain and sun and subter-